



AUGUST 21-23, 2018 • CLEVELAND, OHIO

# Setting up the Next Generation for Success: Transition Planning for Energy Managers





Department of Energy 2018 Better Buildings Summit Transition Planning for Energy Managers

> Matthew Pekar UTC EH&S Senior Manager





- 1. UTC at a glance
- 2. Energy manager requirements
  - Basics
  - Intro to UTC
  - On the Job Training
  - Formal Training
  - Partnerships





## 2017 revenue \$60.2B





Heating, ventilating, cooling & refrigeration systems

Security & fire protection services





Elevators, escalators, moving walkways, people movers & horizontal transportation systems





Industrial & aerospace systems





Aircraft engines, gas turbines & space propulsion systems

# GLOBAL PRESENCE

# Manufacturing sites



#### 2020 SUSTAINABILITY GOALS

## Greenhouse gas reduction



#### **ENERGY MANAGEMENT**

#### Traditional topics:

Lighting, HVAC, Compressed air, Process energy use, Supply management, Building automation

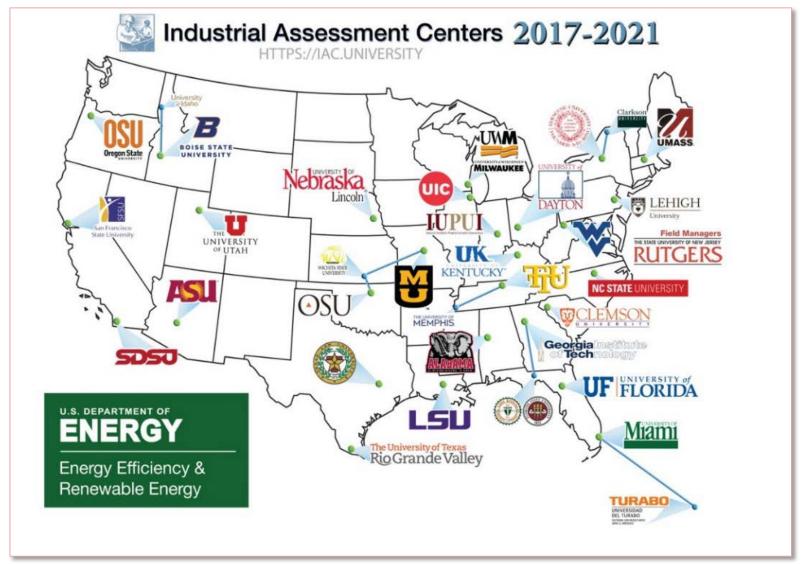
#### Advanced topics:

Renewable energy, GHG management and accounting, Distributed generation, Virtual net metering, Real time data management, Energy procurement

#### Future concepts:

Advanced manufacturing processes, Utility scale energy storage, Robots in manufacturing, Digital factories

#### **ENERGY MANAGEMENT EDUCATION**



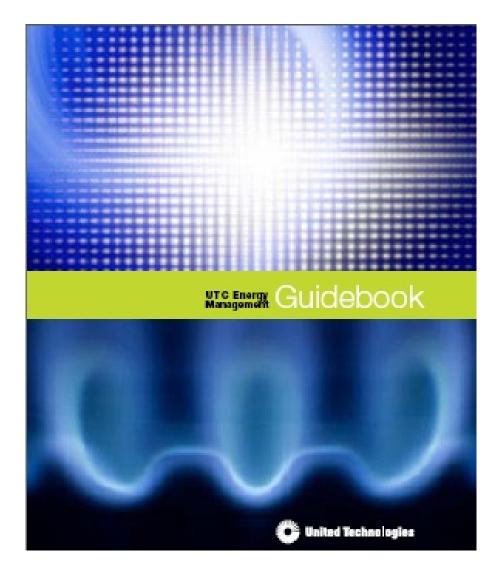
## Career entry



Internships opportunities

EH&S Leadership Program (ELP)

#### ENERGY MANAGEMENT GUIDEBOOK

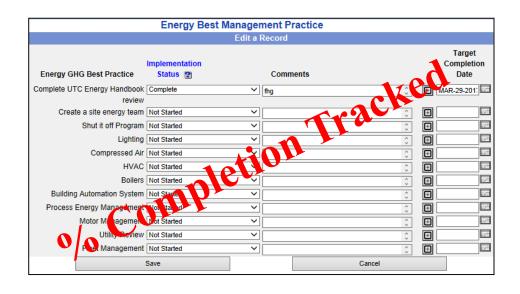


A systematic approach to formulating and implementing an effective energy management plan

#### **UTC ENERGY MANAGEMENT**

## Best management practices

- #1 Complete UTC Energy Handbook review
- #2 Create a site energy team
- #3 Shut-it-off Program
- #4 Lighting
- #5 Compressed Air
- #6 HVAC
- #7 Boilers
- #8 Building Automation System
- #9 Process Energy Management
- #10 Motor Management
- #11 Utility Review
- #12 Fleet Management



#### **ENERGY AUDITS**

					kWh or MMBTU	CO2e	
ECM	Project < 2 year payback	lnv	/estment	\$ Savings	Savings	Reduction	Payback
1	Shut it off	\$	5,000	\$ 46,900	658,876	457	Immediate
2	Shop Lighting	\$	26,400	\$ 26,000	398,268	276	1 yr
3	Office Lighting	\$	3,000	\$ 6,000	72,150	50	6 months
4	Reliability Lab Lighting	\$	500	\$ 1,300	25,974	18	4 months
5	HID Lighting	\$	5,000	\$ 3,300	50,505	35	6 months
6	Misc. Lighting	\$	5,000	\$ 9,200	157,287	109	6 months
7	Process Cooling Tower VFD	\$	5,500	\$ 2,605	37,200	26	2.1 yrs
8	Compressed Air Leaks	\$	20,000	\$ 65,000	1,050,000	728	4 months
9	Air Dryer operation	\$	-	\$ 1,500	16,000	11	Immediate
10	Air Compressor maintenance	\$	3,000	\$ 3,000	70,000	49	1 year
Sub-total		\$	73,400	\$ 164,805	2,536,261	1,758	
					kWh or		
					MMBTU	CO2e	
ECM	Project > 2 year payback	Inv	/estment	\$ Savings	Savings	Reduction	Payback
11	VFD Air Compressor	\$	250,000	\$ 40,000	430,000	298	5 yrs
12	Thermal degreaser energy recovery	\$	200,000	\$ 20,000		194	10 yrs
Sub-total		\$	450,000	\$ 60,000	\$ 510,000	492	
					kWh or		
					MMBTU	CO2e	
ECM	Requires Further Study	Inv	/estment	\$ Savings	Savings	Reduction	Payback
13	Office HVAC Renovation		TBD	\$ 36,000	505,600	350	TBD
14	Main Plant Air Balance		TBD	TBD			
15	Process cooling water pumps		TBD	TBD			TBD

Required every 3-5 years

10% to 15% of audits conducted by UTC

## DOE support



Dallas, TX: Energy Treasure Hunt "Train the Trainer I" Oct 2016

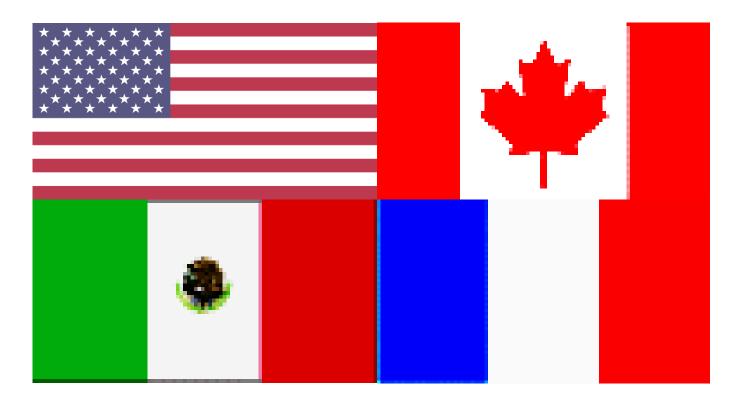
Collierville, TN: Energy Treasure Hunt "Train the Trainer II" Mar 2017

Riverside, CA: Compressed Air Workshop, April 2017

Springdale, AR: Motor Master Energy Audit, January 2018

# On the job training

2017 and 2018 Global In-house "Energy Treasure Hunt" training conducted in the U.S., Canada, France and Mexico



#### Certifications

AEE Certified Energy
Manager (CEM) In-house
training classes in CT and FL

Over 100 CEM's working in Facilities Departments and as Carrier application engineers

## Accreditation & Recognition

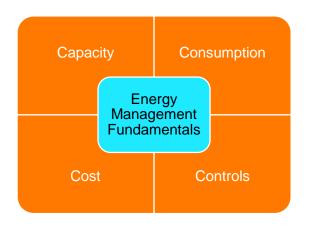
U.S. CEM® & CEA® Programs ANSI Accredited and Recognized by DOE





#### SUCCESSION PLANNING

#### Skill set

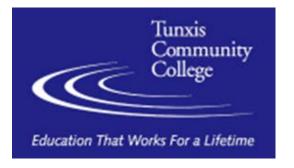




- 1. Energy interest
- 2. Technical background
- 3. Willingness to travel
- 4. Factory experience
- 5. Certifications
- 6. Degrees and diplomas









# **United Technologies**

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# Setting up the Next Generation for Success: Transition Planning for Energy Managers

Leslie Marshall

Corporate Energy Engineering Lead General Mills

# Introduction



- Corporate Energy Engineer for General Mills
  - 2% energy intensity reduction goal
  - 8% GHG emissions reduction goal by the year 2025
- Professional Experience
  - 20+ years spent in manufacturing
  - 17 years supporting various production lines
  - 3+ reducing energy
- Understand business/production constraints that make reducing energy difficult
- Be more empathetic and accommodating to people impacted by energy projects and initiatives

# Optimization is the Next Big Thing



- Capital projects
  - are cool and we should still do them
- Optimization
  - Allows the business to invest money in what's most important (the consumer)
    - Saves energy
    - Saves maintenance costs
    - Avoids essential, unnecessary capital costs
    - Reduces ongoing operating costs on supporting utility equipment
  - Empowers the team and strengthens their technical ability
- Real time monitoring and data-driven decision making

# Block Deployment is the Other Next Big Thing



- Corporate sponsored in-depth training on a specific utility for plants
  - DOE INPLT Compressed Air, Steam
- Provide a detailed task list of next steps to optimize/improve utility
- Coach plant through the action items and provide resources when necessary
- All plants implement tasks together before advancing to the next step
  - Return system to basic conditions
  - Baseline key metrics
  - Look for cost savings opportunities for capital projects

# Strategy's value



- Awareness of how much utilities/facilities can impact the business
- Business growth
  - Energy team has saved over \$12 million in 6 years
  - Invest in product innovation and growth
- Appreciation
  - Everybody loves the people who save them money
- Technical expertise
  - Sense of pride
  - Empowerment

## Hurdles



- An established culture
  - People like how they do things and don't want to change
- Making sure energy stays a priority in a very dynamic business environment

# Take-aways and Suggestions



- Team management skills are AS IMPORTANT AS technical expertise
  - Spend time developing leadership skills
  - Spend time developing presentation skills understanding what data/information is relevant to specific audiences
- Assess the team's passion for energy and change as a first step
  - Identify any gaps between team's ability/skill set and the strategy/goal
  - Understand each team member's motivation and ensure that the strategy caters to it in some way
- Reward the Team

# Take-aways and Suggestions



- Don't get frustrated
- Be persistent
- Practice empathy

# Contact



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Corporate Energy Engineering Lead
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763-764-6290





#### Ryan Spies – Saint-Gobain

#### **Background**

- Mechanical Engineer Lehigh University
- MBA Washington University in St. Louis
- 6 Years in Engineering/Strategy Roles
- 9 Years in Corporate Sustainability for 3 Fortune 500 Companies
- (Former) President Net Impact Philadelphia Professional Chapter







### **Topics Covered**

- Background on Saint-Gobain
- Goals and Leadership
- Engagement & Communications
- Programing
- Award Recognition













#### AT THE BEGINNING OF SAINT-GOBAIN



MINISTER BELLEVIEW AND A TON THE PARTY OF TH

The Hall of Mirrors in Versailles

The Louvre's Pyramid



#### SAINT-GOBAIN'S INTERNATIONALIZATION IN THE 19th CENTURY



1889: Glass Factory in Pisa, Italy

5 / Carrefour Philadelphia 2017

SAINT-GOBAIN

# THE GROUP'S ORGANIZATION

14 General Delegations



Finance
R&D
Marketing
Human Resources
Legal/Tax
Communications



Innovative Materials



Construction Products



**Building Distribution** 

About 50 Activities

More than 1,000 consolidated companies



# FLAT GLASS

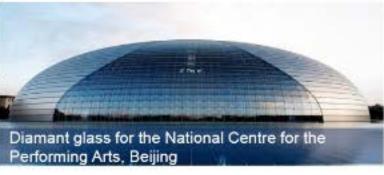
















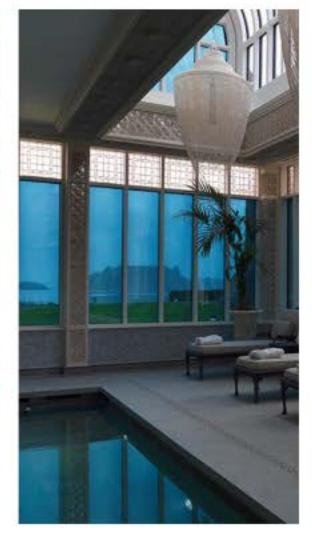


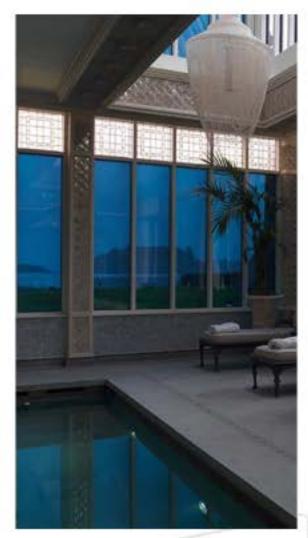


# WE CAN TRANSFORM SPACES WITH SAGE GLASS









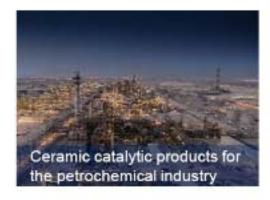


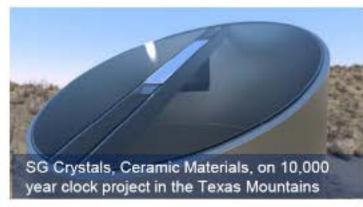
# HIGH-PERFORMANCE MATERIALS





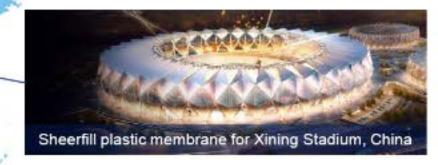














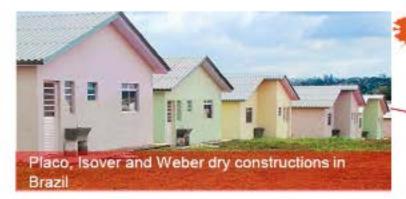


# CONSTRUCTION PRODUCTS









Weber mortar in Mohammed VI university, Morocco









# SAINT-GOBAIN INNOVATIVE INTERIOR AND EXTERIOR SOLUTIONS





- 1/ Cedarboard Insulated siding
- 2/ Optima Blow-in-Blanked Glass Wool Insulation
- 3/ Apollo II Roofing Integrated PV Shingle
- 4/ SilentFX Noise Reducing Gypsum Board





# Sustainability and Energy in North America





# **CSG Goals – Short Term & Long Term**

CSG: 2025 Goals

2010 Baseline



Energy consumption: -15% (MWh/NSP)

Total CO<sub>2</sub> emissions: -20% (MTCo2/NSP)



Water discharge: - 80% (M3/NSP)

Long-term: Zero industrial water

discharge in liquid form



Non-recovered waste: - 50% (Ton/NSP)

Long-term: Zero non-recovered waste



2016 Baseline



Energy consumption: - 5% (MWh/NSP)

Total CO<sub>2</sub> emissions: - 7% (MTCo2/NSP)



Water Withdrawal: - 20% (M3/NSP)

Water Discharge: - 20% (M3/NSP)



Non-recovered waste: - 15% (Ton/NSP)



# **North American Sustainability Champions Network**



 With over 130 manufacturing locations in North America, <u>connecting resources</u> internally has become a primary driver for sustainability at the Delegation





# **Programs for North America**

# Energy Management

- Data Analysis
  - Moving from Annually to Quarterly
  - Broad Development for Leadership Consumption
- Program Development:
  - Lighting as a Service
  - Metering as a Service
  - Energy Service Contracts
- Training:
  - Monthly webinars
  - DOE In-Plant Training
  - Regional Kaizan's
- Networking / Best Practices
  - Global Energy Managers Meeting (2x annually)
  - North America Sustainability Summit

# **Carbon Management**

Internal Price of Carbon Program

Climate Change and Cap & Trade Committee

Renewable Energy

On-Site

Off-Site

# **Water Management**

**Priority Sites** 

Water Balance Help (DOE)

NALCO Partnership





# **SGNA Sustainability Champions Network**

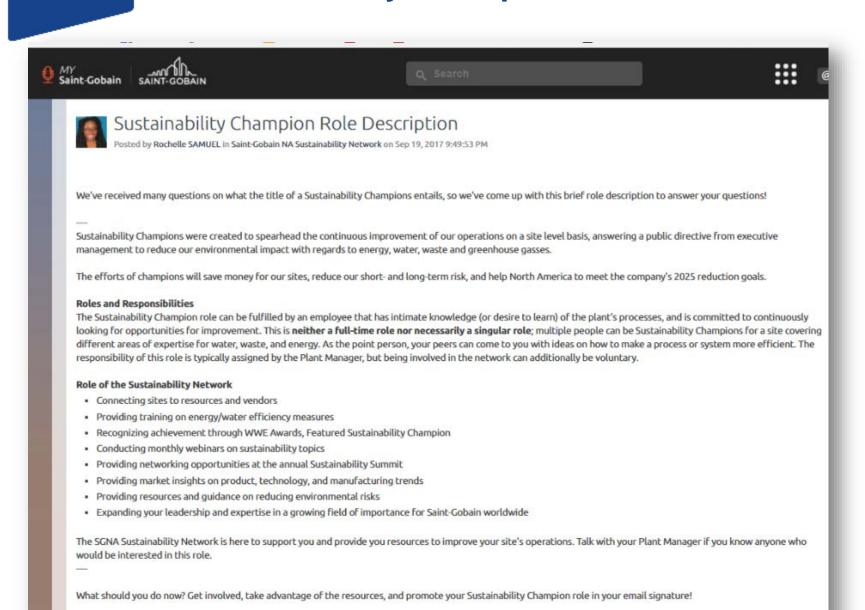
- Each Site has identified a site "Sustainability Champion"
- Some have designated multiple for the fields of Water, Waste, Energy and CO2
   Emissions.
- In addition, the Network also includes:
  - Regional EHS Managers
  - Business Unit Energy Managers
  - CertainTeed Marketing Managers
  - Other interested parties

Over 270 members now make up the network





# **Sustainability Champion**



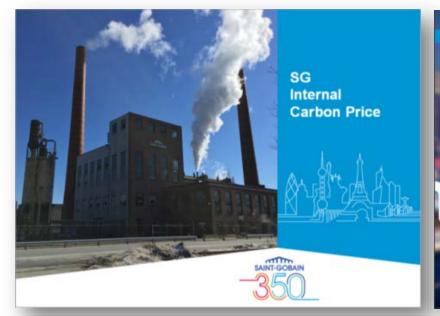
Define their roles!

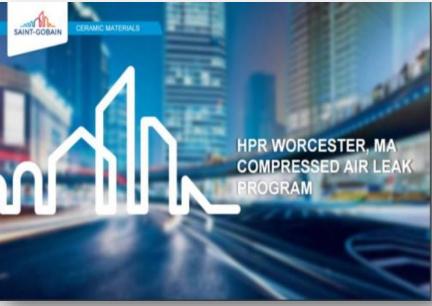
Even if that definition has fluidity.





# **Network Webinars**







### Webinar Series

- Monthly Webinar on variety of topics (Technical, best practices, success projects)
- Most are by internal presenters (Case Studies)
- Some are external presenters (Best practices/resources/vendor opportunities)
- Q&A Sessions afterwards and a recording available offline
- Webinar invites have been forwarded outside of the network on multiple occasions!





# **SGNA Newsletter**





### Coming Up! Internal Events: Saint-Gobain International EHS Day Celebrating Saint-Gobain's world-wide commitment to the Environment, Health, Compressed Air Best Practice Webinar Worcester, MA - High Performance Refractories More Info here DOE in-Plant Trainings: In-Plant Trainings (INPLTs) are workshaps led by DOE experts that train participants on how to identify, Implement, and replicate energy-saving projects. Better Plants partners valunteer to hast an an-alte. Three-day training at one of their facilities, and invite other partner componies to Treasure Hunt Exchange TE Connectivity Plant - Greensboro, NC Compressed Air Tenaris Hickman Plant - Blytheville, AR Treasure Hunt Exchange AbbVie Plant - Chicago, IL

Oct 16, 17, 18

# The Newsletter Highlights:

- Achievement at the Sites
- Successful sustainability projects
- Product Stewardship updates
- Upcoming Events/webinars/training opportunities (both internal and external)
- Relevant external news and guides on energy, water, waste and emissions.





# **Best Practices – A Collection from 2018**

SITE	PROJECT
Bristol, RI Performance Plastics	MELDIN® Solvent Waste Reduction
Soddy-Daisy, TN NorPro	Panoramic Power Electrical Submetering
Avery/Milan, OH CertainTeed Roofing	Core Splitter Project
Faribault, MN Sage Glass	Waste Reduction
L'Anse, MI CertainTeed Ceilings	Project Lake Dixon
Moundsville, WV CertainTeed Gypsum	Fan Speed Reduction Project
Brownsville, TX Abrasives	Water Reduction in Cooling Towers
Norwood, MA CertainTeed Roofing	Landfill Site to Solarfield
Albion, NY ADFORS	Plant Make Up Air Upgrades





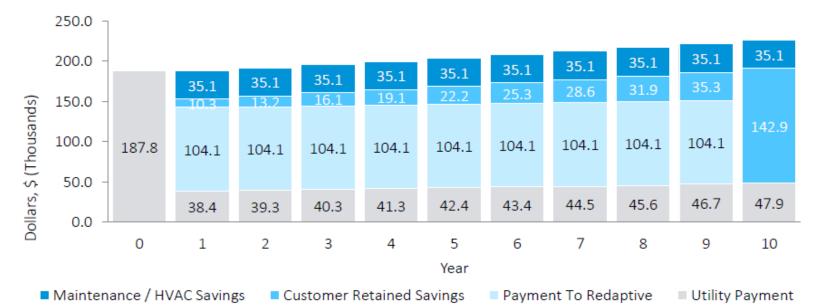
# **CAPEX Free Lighting**

### Retrofit Overview

- Current Electrical Consumption (kWh): 2,502,775
- Post-Install Electrical Consumption (kWh): 628,531
- Annual Consumption Savings (kWh): 1,874,244
- Current Utility Rate: \$0.061
- Utility Rebate: \$45,123

- Gross Annual Lighting Savings: \$114,411
- Estimated Annual Maintenance Savings: \$35,050
- Estimated Annual Payment to Redaptive: \$104,114
- Term Length: 9
- Saint Gobain Retained Lighting Savings: 9%
- Saint Gobain Retained Maintenance Savings: 100%

### Customer Cash Flows Over Contract Length



\$45,347 / \$149,462

Ann. In-Term Utility Savings

Ann. Post-Term Savings

\$695,267

Saint Gobain 10-Year Total Savings Including Maintenance Savings and Utility Rate Inflation





# **Panoramic Power Energy Monitoring Technology**



### SENSOR

Clamped around wire of monitored circuit

### BRIDGE

Receives signal from Sensor and sends to Server in Cloud

### DASHBOARD/MOBILE

Real Time Alerts and Reports generated from Sensor data

### **BENEFITS:**

- Monitor run hours and trends in energy consumption of individual loads
- Predictive equipment maintenance based on actual run hours
- Predictive equipment maintenance based on accumulated energy usage data
- Identify equipment issues proactively

### **DIFFERENTIATORS:**

- Low cost
- Clip-on instead of wired
- Online analysis tool
- Real-time, continuous monitoring
- Site insights reports by experts







# **Goals for 2018 Summit**

- Network with Peers
- Engage with the speakers
- Learn Something
- Teach Something
- Share Best Practices
- Award Achievement
- Network with Peers
- Solve Problems
- Help us improve
- Network with Peers

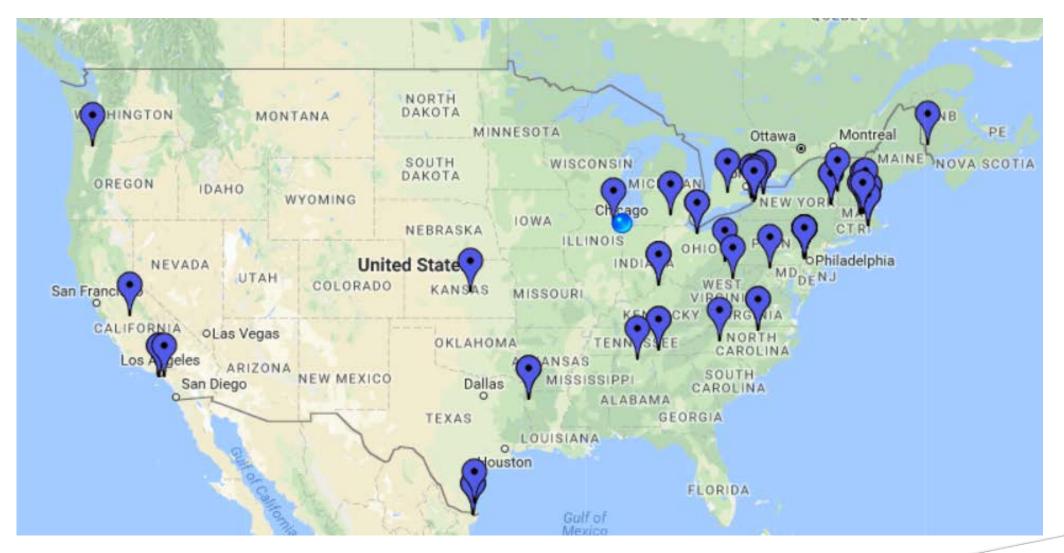




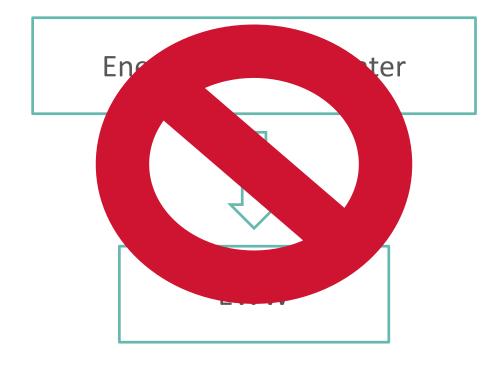




# Representation at the 2018 Sustainability Summit









Water – Waste - Energy



WWE











# **WWE Awards Overview**

The Goal of the Awards is to encourage sustained achievement in North America.

The objective is simple: <u>creatively inspire</u> <u>competition</u> among sites to reduce their environmental impact (waste, water, energy & CO2) and to <u>sustain</u> those reductions and attitudes.





# **Awarding Achievement**







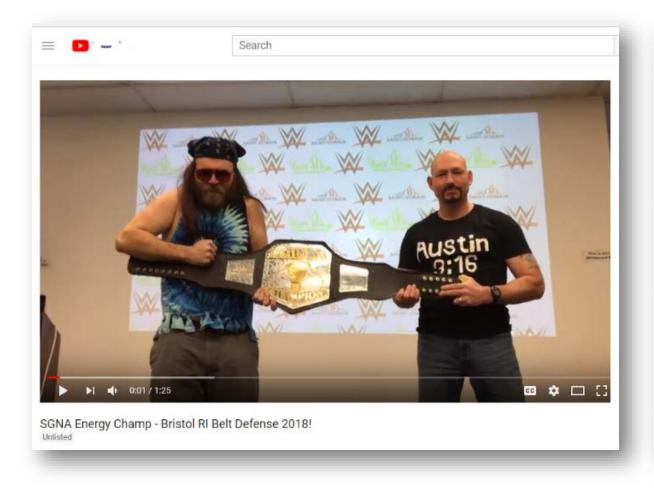


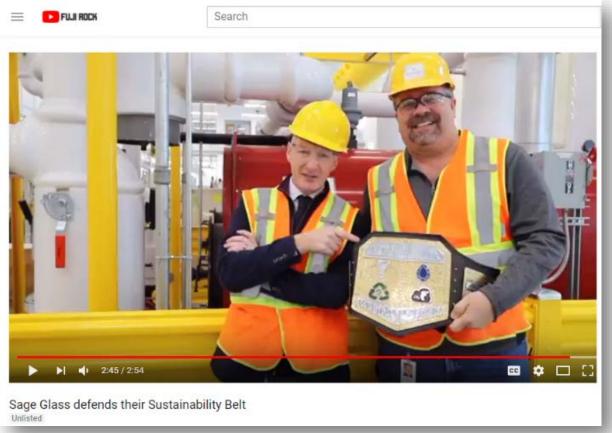






# **Smack Talk – YouTube Videos**







# **2018 Awards**





CEO

# Our Communities Should also Recognize this Achievement

# FARIBAULT.com Daily News

Home News Sports Opinion Obituaries Community Business Classifieds E-Editions Submission For

Business

Home / Faribault Daily News / Business





### SageGlass earns 'Energy Champion' honor, besting 150 other Saint-Gobain plants

SageGlass beat out 150 other Saint-Gobain locations to become the 2016 Saint-Gobain "Energy Champion\* for 2016, thanks to its commitment to energy efficiency.





MONDAY, JANUARY 23, 2017

NIAGARA-GAZETTE.COM

NIAGARA FALLS, NEW YORK . \$1.00

official declines to

egional president of Empire State Development Corp., failed to shed any new

place in cities and state col leges across New York, Hoyt spoke Friday and took ques-

tions from some members of

Meadow

upgrade

Council looking at

aligning Meadow

Drive and 19th

BY MIA SUMMERSON

Avenue.

See PLANS, Page 5A

get into specifics

during visit.

light on the

state officials

BY PHILLP GAMBIN

# out of patience

K en Cosentino was clearly frustrated. You could hear it n just about every word of the letter he read out loud on Friday.

In a room full of prin viduals who would the cause of Gov. Andrey MARK SCHEER Cuomos



who are still dealing with a whole lot of issues while

being told things are get-ting better, little by little. During a special pre-sentation of Cuomo's 2017 udget plan at city hall o ve, former state Assen he's not happy with the irection of things. He said he's tired of crumbling neighbor-hoods, the "subpar" quality of life, lack of

opportunities and failure to address hig problems like heroin addiction. cism for the people who run state parks, asking why they are doing so

what should be an all-na ural Niagara Falls State Park, putting up fences that prevent people from fully accessing the mighty "Jobs with livable

wages are still few and fa between, meanwhile the state park flourishes dur with millions of visitor spending countless dol-lars," he said.

president of the state's conomic development lepartment in Western New York, listened qui etly as Cosentino finish

his letter. He then did what guys who have been in the business of politics and government as long as him get appointed to do See SCHEER, Page

WHERE TO TURN

### WE belt for Saint-Gobain | Falls



on the horizon

### Falls plant owned by French corporation wins top energy prize in North America



Albert McKinney, Saint-Gobain's Ekonol production around the globe, gave is designed is you have to operator, shows off the special polyester resin with a high the prize in a competition defend the belt," said site

warded recently to the Sains Cobain plant on Wal-nore Roadwas not the prize one for the reduction of from any wrestling match. waste, one for the reduc-But it was a win just the tion of water and one for the same and it made quite an reduction of energy usage—mpact at the plant on Wal-thus the name WWE for the nore Road — as well as on belts. The local plant won the local environment.

he local environment. the belt for water reduction.
The French-owned build-usage, but they are going to materials company, have to fight if they want to ich has manufacturing keep the prize. ilities in 66 countries "The way the program" among its North American

Work on a series of improve-ments for the Meadow Drive Over the last several years, a number of enhancements have been made to the road

in 2014, which connected the See UPGRADE, Page 5A



Commercial

**Fabrication** 

eSource Book

### Saint-Gobain Recognizes Sites for Leadership in Conservation with Sustainability Awards

Glass Magazine December 2, 2016

COMMERCIAL, RETAIL, FABRICATION

Saint-Gobain announced the winners of its sustainability awards program, which recognizes company locations across North America for their sustainability efforts. The winning sites were recognized at a companywide sustainability conference this fall

"Saint-Gobain's commitment to sustainability compels us to consider the environmental impact of our business at every stage, from product design to product disposal at the end of life," says John Crowe, president and CEO of Saint-Gobain and CertainTeed Corps. "As a company, we realize it is the aggregate of efforts made by our approximately 14,000 employees that will allow us to reach our ambitious targets for waste, water, energy and carbon dioxide (CO2) reduction, and we believe recognizing sites for their world-class programs will advance achievement across our portfolio."

The program, referred to as the Waste, Water and Energy Program was established in 2016 by the Saint-Gobain Environmental, Health and Safety Department. The program is designed

ability of sites.

panized the following





